BTA Foils 2003

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November 7, 2003

New foils were mounted on holders 2, 5, 6, 7, and 8 in early September 2002. This set of foils is shown in **Figure 1**. In September of this year (2003) new foils were mounted again, this time on holders 3, 6, and 7 as indicated in **Table 1**.

Table 1: BTA Foils after new ones were mounted in September 2003

Holder	Foil Material	Δt	Δx	Status
1	Empty	Inches	mg/cm^2	UC
2	Carbon	.003	14.4	UC
3	Beryllium	.005	23.5	New
4	Carbon	.005	23.1	UC
5	Carbon	.0051	24.1	UC
6	Beryllium	.006	28.2	New
7	Silica	.005	28.0	New
8	Silica	.0041	23.0	UC

The notation UC stands for unchanged. The changes from last year (2002) are:

1. A 0.005 inch thick Beryllium foil replaces the 0.004 inch thick Carbon foil in holder 3.
2. A 0.006 inch thick Beryllium foil replaces the Mica foil in holder 6.
3. A 0.005 inch thick Silica foil replaces 0.00276 inch thick Titanium foil in holder 7.

The foils in holders 2, 4, 5, and 8 remain unchanged. **Figure 2** shows the set of foils just before they were put back in the BTA line in September

2003. Note that the silica foil in holder 8 has acquired a bump which protrudes in the downstream beam direction.

Around 30 October 2003 it was discovered that BTA foils 5 and 6 could not be rotated into position. Upon opening up the BTA spool piece on 3 November it was found that a screw protruding from one of the holders was stopping the rotation of the assembly. **Figure 3** shows the foils just after they were taken out of the spool piece. The carbon foil in Holder 5 is clearly broken. This may have happened as the assembly was being lifted out of the spool piece. Although it can not be seen in the photograph, the carbon foil in Holder 2 has a long crack. The raised bump visible on the silica foil in Holder 8 protrudes in the downstream beam direction. **Figure 4** shows a close-up of the bump. Note the area of crystallization around the bump. Note also that the foil has several long cracks. These were not visible until the day after the foils were taken out of the BTA spool piece. One thought is that the thin carbon coating on the foil was holding the cracked pieces together until exposure to air or vibration caused the cracks to be uncovered.

Following the removal of the foil assembly from the BTA line, new carbon foils were mounted on holders 2 and 5 and a new silica foil was mounted on holder 8. Both sides of the beryllium foil in holder 3 were coated with a 20 μg/cm^2 layer of carbon. **Table 2** lists the present set of foils. These are shown in **Figure 5** shortly before they were re-installed in the BTA line on 5 November 2003. Note that both sides of the the two silica foils are coated first with a 20 μg/cm^2 layer of titanium and then with a 20 μg/cm^2 layer of carbon. The new carbon foils were cut from 0.003 and 0.005 inch thick pieces of carbon that Dan Lehn had on hand.

Table 2: BTA Foils after new ones were mounted on 5 November 2003

Holder	Foil Material	Δt	Δx	Status
1	Empty	Inches	mg/cm^2	UC
2	Carbon	.003	13.9	New
3	Beryllium	.005	23.5	Coated
4	Carbon	.005	23.1	UC
5	Carbon	.005	23.1	New
6	Beryllium	.006	28.2	UC
7	Silica	.005	28.0	UC
8	Silica	.005	28.0	New

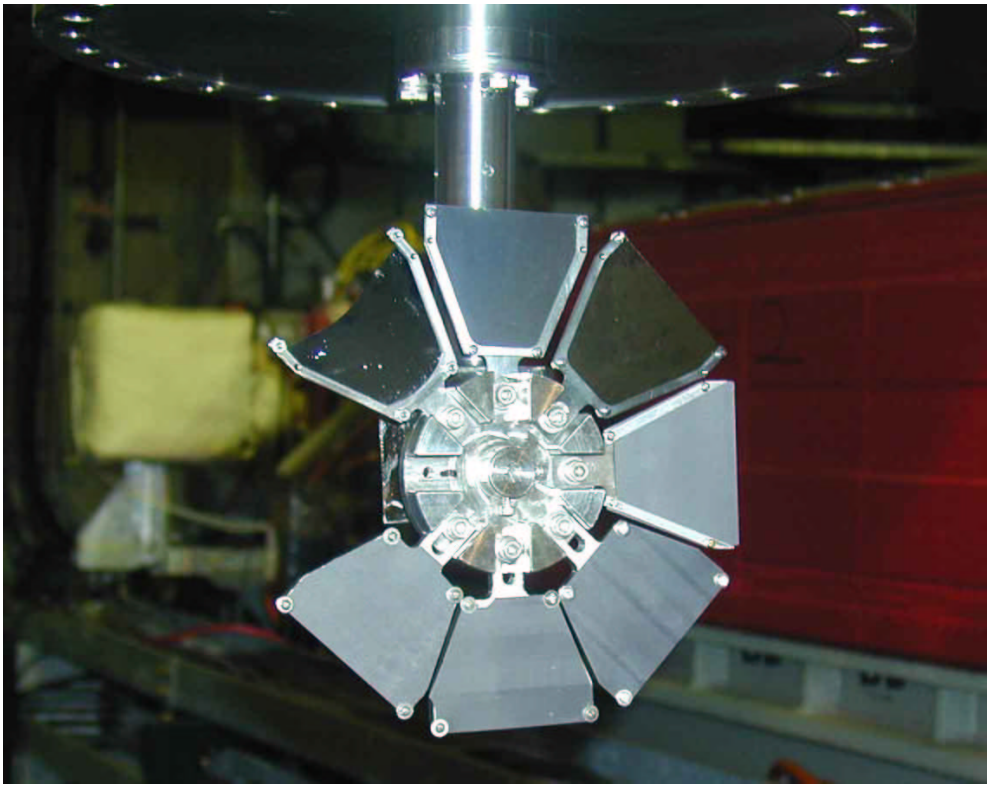

Figure 1: BTA Foils after new ones were mounted in September 2002. The beam direction here is into the picture. Holder 2 is just below the empty slot. Holders 3 through 8 follow consecutively going counter-clockwise from Holder 2.

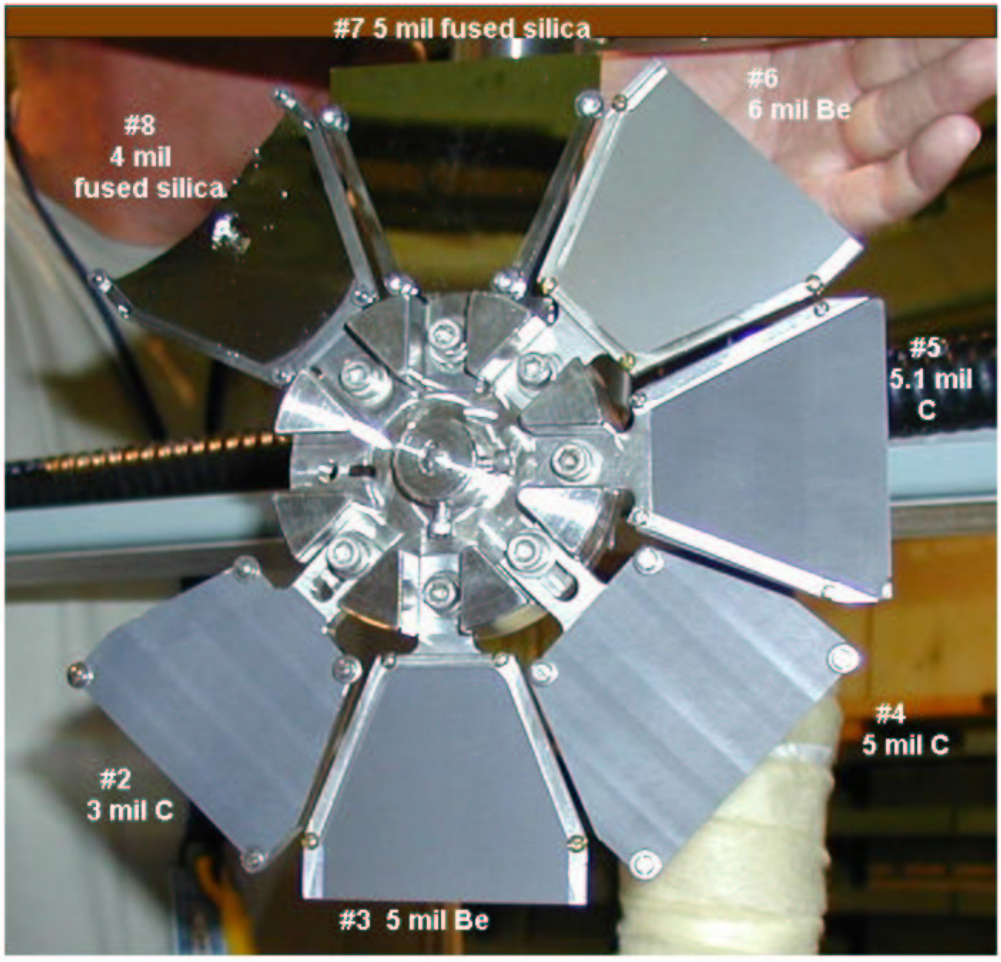

Figure 2: BTA Foils after new ones were mounted in September 2003. The beam direction here is into the picture. Holder 2 is just below the empty slot. Holders 3 through 8 follow consecutively going counter-clockwise from Holder 2. Note that the silica foil in holder 8 has acquired a bump which protrudes in the downstream beam direction.

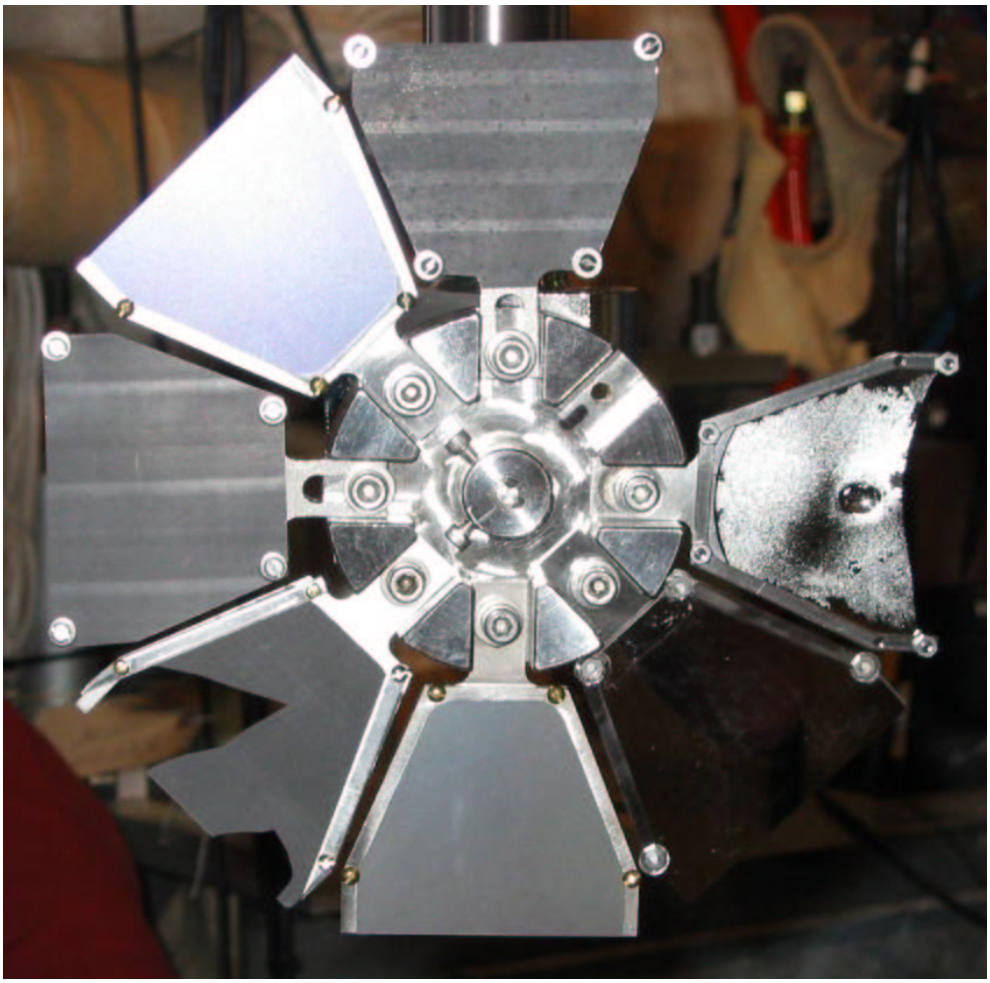

Figure 3: BTA Foils just after they were taken out of the BTA spool piece on 3 November 2003. The beam direction here is into the picture. Holder 2 is just to the left of the empty slot. Holders 3 through 8 follow consecutively going counter-clockwise from Holder 2. The carbon foil in Holder 5 is broken, and, although it can not be seen here, the carbon foil in Holder 2 has a long crack. The raised bump on the silica foil in Holder 8 protrudes in the downstream beam direction.

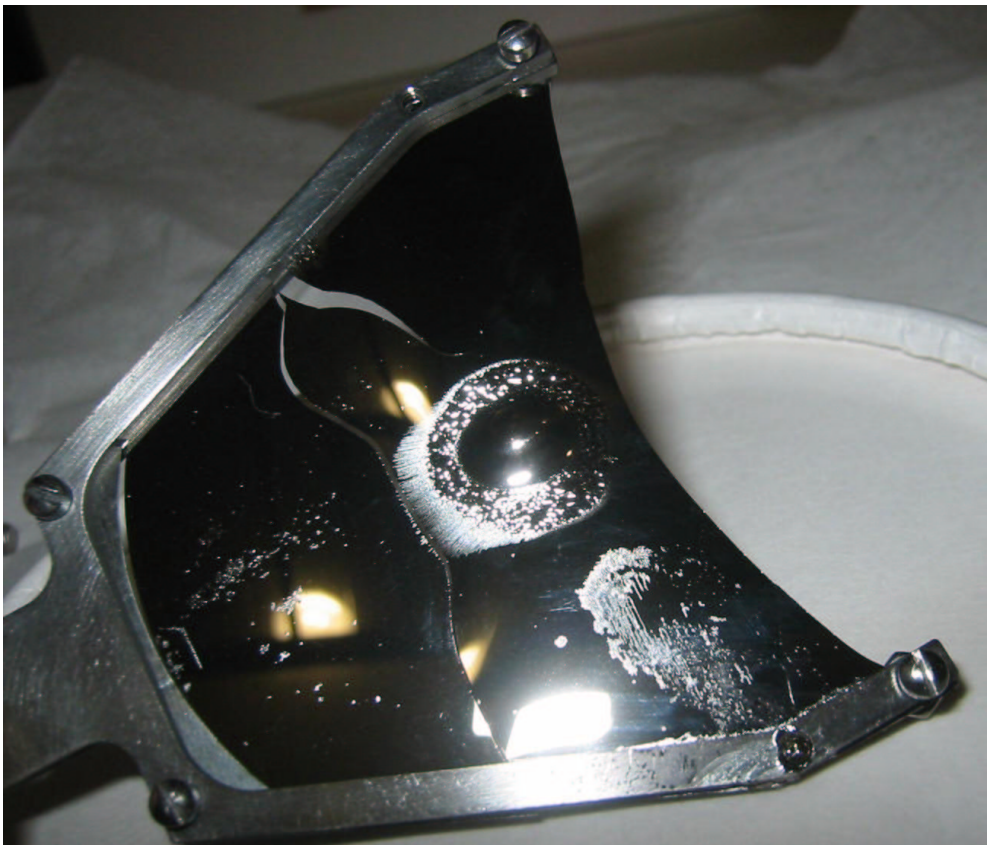

Figure 4: Close-up of the bump on the silica foil in holder 8. Note the area of crystallization around the bump. Note also that the foil has several long cracks. These were not visible until the day after the foils were taken out of the BTA spool piece. One thought is that the thin carbon coating on the foil was holding the cracked pieces together until exposure to air or vibration caused the cracks to be uncovered.

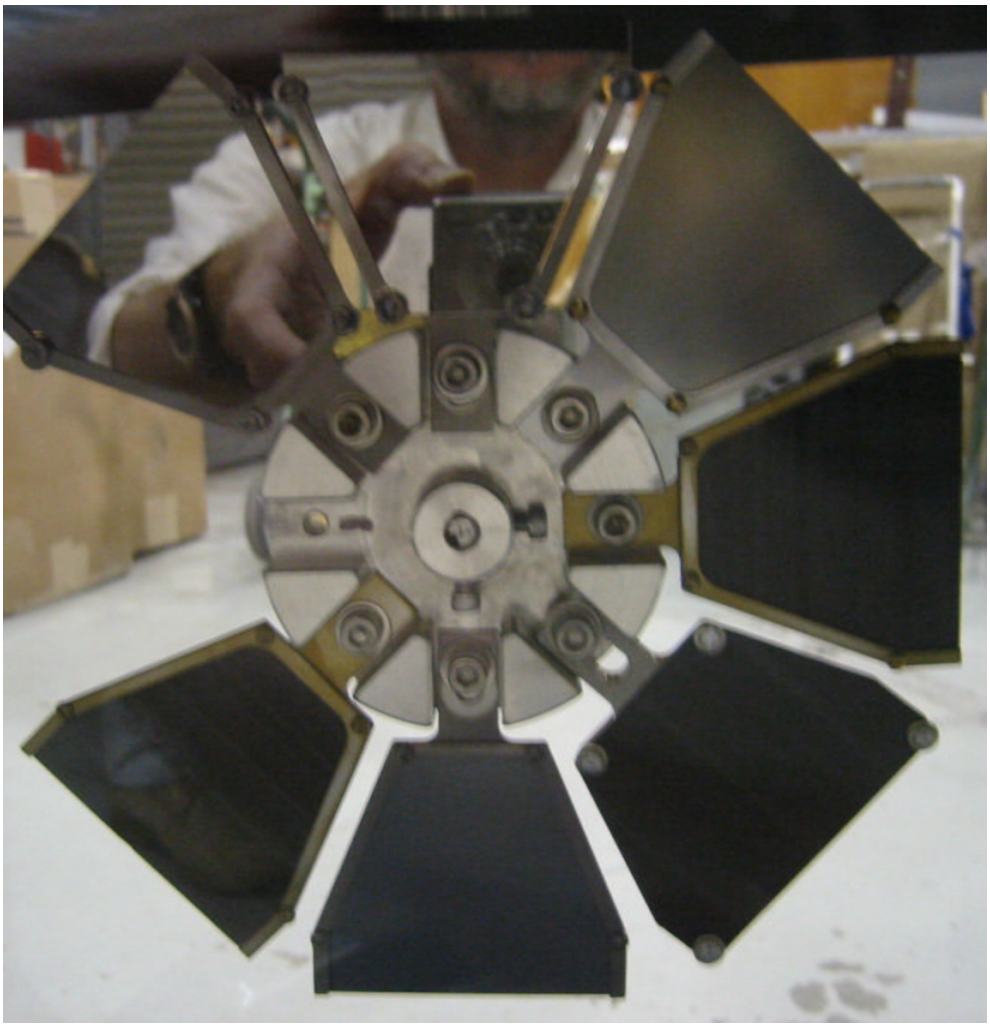

Figure 5: BTA Foils after new ones were mounted on 5 November 2003. The beam direction here is into the picture. Holder 2 is just below the empty slot. Holders 3 through 8 follow consecutively going counter-clockwise from Holder 2.